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Clinical Outcomes after Anterior ST-Elevation Myocardial Infarction According to LAD Lesion Location: The INFUSE-AMI Trial

Sorin Brener[1], Bernhard Witzenbichler[2], Akiko Maehara[3], Joe Dizon[4], Martin Fahy[3], Magdi El-Omar[5], Jan-Henk Dambrink[6], Roxana Mehran[7], Keith Oldroyd[8], Helen Parise[9], C. Michael Gibson[10], Gregg Stone[11]
[1]New York Methodist Hospital, Brooklyn, NY, [2]Charité Campus Benjamin Franklin, Berlin, Germany, [3]Cardiovascular Research Foundation, New York, NY, [4]Columbia University, New York, NY, [5]Manchester Heart Centre, Mancheter, United Kingdom, [6]Isala klinieken, Zwolle, Netherlands, [7]Mount Sinai Hospital, New York, NY, [8]University of Glasgow, Glasgow, United Kingdom, [9]Cardiovascular Research Foundation, New York, NY, [10]Beth Israel Deaconess Med Ctr - Harvard Medical School, Boston, USA, [11]Columbia University and Cardiovascular Research Foundation, New York, NY

Background: Prognosis of ST-elevation myocardial infarction (STEMI) is determined predominantly by the extent of myocardial damage and hemodynamic status. Thus, in previous studies patients with proximal LAD occlusion have had worse outcome than those with more distal LAD lesions. It is not known whether modern reperfusion therapy has altered this relationship.
Methods: The INFUSE-AMI trial randomized patients with anterior STEMI due to proximal or mid LAD occlusion to intracoronary bolus abciximab delivered locally via the ClearWay RX catheter vs. no abciximab, and to manual thrombus aspiration with the Export catheter vs. no aspiration. The primary endpoint was core laboratory assessed MRI infarct size (IS, % of LV mass) at 30 days. Lesion location was assessed at a core laboratory blinded to randomization and outcomes and was defined as proximal (pLAD) if present before or at first significant septal perforator branch, or mid (mLAD) if beyond it.
Results: The study enrolled 452 patients. The median age was 61y, 74% were men and 11% had diabetes. Intracoronary abciximab reduced IS (% LV mass): 15.1[6.8-22.7] vs. 17.9[10.3-25.4], P=0.03. Thrombectomy had no effect on IS. There were 292 (64.7%) patients with pLAD and 159 (35.3%) with mLAD occlusion. Patients with pLAD presented more often within 3h of symptom onset and had lower systolic blood pressure, but did not differ from mLAD patients with respect to heart rate, Killip class or extent of coronary disease. Thrombectomy was performed in 49.3% and 56.0% of the two groups, P=0.18 and intracoronary abciximab was used in 46.9% and 47.2%, respectively, P=0.79. Reperfusion succes, infarct size and major clinical outcomes are listed in Table.
Conclusions: These data confirm the excess risk of death associated with pLAD infarcts even with contemporary reperfusion therapy. Reduced TIMI 3 flow rates and larger IS in pLAD infarcts translate into increased mortality.

	Proximal LAD	*Mid LAD*	*P value*
Final TIMI 3 flow, %	*89.4*	*95.0*	*0.04*
Final blush score 2 or 3, %	*82.1*	*79.9*	*0.56*
Corrected TIMI frame counts	*20[16, 26]*	*20[16,26]*	*0.78*
ST segment resolution, %	*72[49, 86]*	*72[41, 92]*	*0.93*
Procedure success, %	*87.2*	*94.3*	*0.02*
Infarct size, % of LV at 30 days	*19.3[9.2, 25.9]*	*14.3[6.2, 18.9]*	*<0.0001*
Death at 30 days, %	*4.2*	*0.6*	*0.04*
Stent thrombosis, definite/probable, %	*1.4*	*0*	*0.14*
MACCE (death, infarction, stroke, revascularization)	*4.8*	*2.6*	*0.24*

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Impact of Successful Thrombus Retrieval During Primary Percutaneous Coronary Intervention With Thrombus Aspiration on Infarct Size and Microvascular Obstruction: Insight From Contrast-Enhanced Magnetic Resonance Imaging

Romain Chopard[1], Philoktimon Plastaras[1], Jerome Jehl[1], Vincent Descotes-Genon[1], Marie-France Seronde[1], Sebastien Janin[1], Bruno Kastler[1], Francois Schiele[1], Nicolas Meneveau[1]
[1]University Hospital Besancon, France, Besancon, France

Background: Thromboaspiration (TA) during primary percutaneous intervention (PPCI) is effective in opening the infarct-related artery in patients with ST-segment elevation myocardial infarction (STEMI), leading to better reperfusion and improved outcome. However, the effect of positive macroscopic efficiency of TA remains unknown. We aimed to evaluate the impact of positive thrombus retrieval during PPCI with manual TA on infarct size (IS) and microvascular obstruction (MVO) as assessed by contrast-enhanced magnetic resonance imaging (CE-MRI) in a subset of patients with STEMI.
Methods: Inclusion criteria were patients aged <75 years, with first STEMI referred for PPCI within 12 hours of onset of symptoms, infarct-related artery ≥2.5 mm in diameter, thrombus score ≥3 and no prior history of coronary disease. All patients underwent TA before stenting and were categorized according to positive or negative TA. Clinical and procedural characteristics of study population were recorded and CE-MRI was performed at 5 days and 6-months to evaluate MVO and IS.
Results: 88 patients were enrolled, mean age 55±10 years; 43.1% in the positive TA group. Main results are presented in the table. Clinical and procedural characteristics (90-min total ischemic time, ST-segment resolution, post-procedural TIMI flow grade and post-stenting myocardial blush grade, and peak troponin) did not differ significantly between groups. Independent predictors of final IS were: positive TA (OR 0.34, 95%CI 0.03-0.71), MVO (OR 1.75, 95%CI 1.28-0.71) and IS at 5 days (OR 2.06, 95%CI 1.87-3.32).

	Negative TA (N=50)	Positive TA (N=38)	p
Microvascular obstruction (%)	7.6±5.1	3.8±3.1	0.003
Infarct size in the acute phase (%)	28.2±20.8	14.9±8.7	0.004
Final Infarct size at 6 months (%)	22.3±19.3	12.0±8.3	0.002

Conclusions: Positive thrombus retrieval during primary PPCI with manual TA in STEMI reduces MVO and in the acute phase and at 6 months and represents a powerful predictor of final infarct size.

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Frequency, Timing and Implications of Reinfarction after Primary Stenting in ST-Segment Elevation Myocardial Infarction: The HORIZONS-AMI trial

Samantha Stone[1], Roxana Mehran[2], Bernhard Witzenbichler[3], Giulio Guagliumi[4], Jan Peruga[5], Bruce Brodie[6], Dariusz Dudek[7], Martin Mockel[8], Gregg Stone[9]
[1]Cardiovascular Research Foundation, NY, NY, [2]Mount Sinai Hosptial, New York, USA, [3]Charité Campus Benjamin Franklin, Berlin, Germany, [4]Ospedali Riuniti di Bergamo, Bergamo, Italy, [5]Medical University of Lódz, Lodz, LODZ, [6]LeBauer CV Research Foundation, Greensboro, NC, [7]University Hospital, Krakow, Poland, [8]Charite Campus Virchow-Klinikum, Berlin, Germany, [9]Columbia University Medical Center and the Cardiovascular Research Foundation, New York, NY

Background: In early studies, reinfarction after primary angioplasty occurred relatively frequently and was an important cause of mortality in STEMI. The frequency, timing and implications of reinfarction in the contemporary primary PCI era have not been described.
Methods: In HORIZONS-AMI, 3,602 pts with STEMI at 123 sites were randomized to heparin + glycoprotein IIb/IIIa inhibitor (GPI) vs. bivalirudin, and to paclitaxel-eluting stents vs. bare metal stents (BMS). Clinical FU was conducted for 3 years.
Results: Stents were implanted in 3,202 pts, comprising the current study cohort. Reinfarction within 3 years occurred in 221 pts (6.9%) at median [IQR] 244 [22, 573] days. Reinfarction developed within 30 days in 59 pts (27.0%); thereafter the incident rate of reinfarction was linear and constant until 3 years, with no plateau evident. Of note, definite stent thrombosis was responsible for 115 of the 221 reinfarctions (52.0%). The unadjusted 3-year reinfarction rate was lower in pts assigned to bivalirudin vs. heparin + GPI (6.3% vs. 8.3%, p=0.04), but was not different with DES vs. BMS (7.0% vs. 8.1%, p=0.31). By multivariable analysis, independent predictors of reinfarction were current smoking (P=0.009), Killip class ≥1 (P=0.03), stent length (P=0.006), platelet count (P=0.0003), symptom to balloon time (P=0.02), multivessel disease (P=0.0004) and prior MI (P<0.0001). At 3 years, pts with vs without reinfarction had higher unadjusted rates of cardiac death (9.8% vs. 3.2%, P<0.0001) and all-cause mortality (13.1% vs. 5.8%, P<0.0001). In a time and covariate adjusted Cox multivariable model, reinfarction was an independent predictor of 3-year cardiac death (HR[95%CI] = 8.39 [4.77, 14.77], P<0.0001) and all-cause mortality (HR[95%CI] = 3.25 [1.98, 5.35], P<0.0001).
Conclusions: Despite improvements in drugs and devices, reinfarction after primary PCI still occurs relatively frequently with both BMS and DES; is often due to stent thrombosis; and is strongly associated with subsequent cardiac death and all-cause mortality. Safer stents and more effective antithrombotic agents are required to prevent reinfarction and further improve outcomes in STEMI.

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Manual Thrombectomy during Primary Percutaneous Coronary Intervention Can Preserve the Index of Microcirculatory Resistance in Patients with Anterior ST-Segment Elevation Myocardial Infarction

Seong Ill Woo[1], Ji Hoon Jang[1], Soo Han Kim[1], Dae-Hyeok Kim[1], Keum-Soo Park[1], Sang-Don Park[2], Sung-Hee Shin[1], Dong-Hyeok Yang[1]
[1]Inha University Hospital, Incheon, Korea, Republic of, [2]Seoul National University Bundang Hospital, Sungnam, Korea, Republic of

Background: Despite recovered normal epicardial coronary flow after primary percutaneous coronary intervention (PCI) for ST-segment elevation myocardial infarction (STEMI), microvascular damage and dysfunction limit the effect of primary PCI. The purpose of this study was to evaluate whether manual thrombectomy can preserve the index of microcirculatory resistance (IMR) after primary PCI in patients with anterior STEMI.